Geometry

Common to both Cores (based on new core language)	New Core Only	Old Core Only
Standard I: Students will use algebraic, spatial, and logical reasoning to solve geometry problems. **Objective 1: Use inductive and deductive reasoning to develop mathematical arguments.** • Write conditional statements, converses, and inverses, and determine the truth value of these statements. • Prove a statement false by using a counterexample.	• Formulate conjectures using inductive reasoning.	
Objective 2: Analyze characteristics and properties of angles. • Use accepted geometric notation for lines, segments, rays, angles, similarity, and congruence. • Identify and determine relationships in adjacent, complementary, supplementary, or vertical angles and linear pairs. • Classify angle pairs formed by two lines and a transversal. • Prove relationships in angle pairs. • Prove lines parallel or perpendicular using slope or angle relationships.		• Differentiate between parallel, perpendicular, skew, and intersecting lines
Objective 3: Analyze characteristics and properties of triangles. • Prove congruency and similarity of triangles using postulates and theorems. • Identify medians, altitudes, and angle bisectors of a triangle, and the perpendicular bisectors of the sides of a triangle.	• Justify concurrency theorems for medians, altitudes and angle bisectors of a triangle, and the perpendicular bisectors of the sides of a triangle. • Prove the Pythagorean Theorem in multiple ways, find missing sides of right triangles using the Pythagorean Theorem, and determine whether a triangle is a right triangle using the converse of the Pythagorean Theorem. • Prove and apply theorems involving isosceles	• Classify and use the properties of acute, right, scalene, obtuse, isosceles, equilateral or equiangular triangles.

	triangles. • Apply triangle inequality theorems.	
Objective 4: Analyze characteristics and properties of polygons and circles. • Use examples and counterexamples to classify subsets of quadrilaterals. • Derive, justify, and use formulas for the number of diagonals, lines of symmetry, angle measures, perimeter, and area of regular polygons. • Define radius, diameter, chord, secant, arc, sector, central angle, inscribed angle, and tangent of a circle. • Show the relationship between intercepted arcs and inscribed or central angles, and find their measures.	• Solve problems using the properties of radii, diameters, chords, secants, arcs, sectors, central and inscribed angles, and tangents of circles. • Prove properties of quadrilaterals using triangle congruence relationships, postulates, and theorems.	• Define *pi* as the ratio of the circumference to the diameter of a circle. • Solve real world problems using properties of congruent and similar figures, e.g. How much paint is needed to paint a room?" or "How can we ensure square corners in a building during construction?"
Objective 5: Perform basic geometric constructions, describing and justifying the procedures used. • Copy and bisect angles and segments. • Construct perpendicular and parallel lines.	• Investigate geometric relationships using constructions. • Justify procedures used to construct geometric figures. • Discover and investigate conjectures about geometric properties using constructions.	
Objective 6: Analyze characteristics and properties of three-dimensional figures. • Identify and classify prisms, pyramids, cylinders and cones based on the shape of their base(s). • Identify three-dimensional objects from different perspectives using nets, cross-sections, and two-dimensional views.	• Describe the symmetries of three-dimensional figures. • Describe relationships between the faces, edges, and vertices of polyhedra.	• Sketch cross-sections of geometric solids

Standard II: Students will use the language and operations of algebra to explore geometric relationships with coordinate geometry. **Objective 1: Describe the properties and attributes of lines and line segments using coordinate geometry.** • Verify the classifications of geometric figures using coordinate geometry to find lengths and slopes. • Write an equation of a line perpendicular or a line parallel to a line through a given point.	• Find the distance between two given points and find the coordinates of the midpoint.	• Perform and analyze transformations using coordinate geometry.
Objective 2: Describe spatial relationships using coordinate geometry. • Graph a circle given the equation in the form $(x - h)^2 + (y - k)^2 = r^2$, and write the equation when given the graph.	• Determine whether points in a set are collinear.	
Standard III: Students will extend concepts of proportion and similarity to trigonometric ratios. **Objective 1: Use triangle relationships to solve problems.** • Solve problems using the properties of special right triangles, e.g., 30°, 60°, 90° or 45°, 45°, 90°. • Identify the trigonometric relationships of sine, cosine, and tangent with the appropriate ratio of sides of a right triangle. • Express trigonometric relationships using exact values and approximations.		
Objective 2: Use the trigonometric ratios of sine, cosine, and tangent to represent and solve for missing parts of triangles. • Find the angle measure in degrees when given the trigonometric ratio. • Find the trigonometric ratio given the angle measure in degrees, using a calculator.		• Find missing parts of triangles using the Law of Sines or Law of Cosines

• Find unknown measures of right triangles using sine, cosine, and tangent functions and inverse trigonometric functions.		
Standard IV: Students will use algebraic, spatial, and logical reasoning to solve measurement problems. **Objective 1: Find measurements of plane and solid figures.** • Develop surface area and volume formulas for polyhedra, cones, and cylinders. • Determine perimeter, area, surface area, lateral area, and volume for prisms, cylinders, pyramids, cones, and spheres when given the formulas. • Calculate or estimate the area of an irregular region. • Find the length of an arc and the area of a sector when given the angle measure and radius.	• Find linear and angle measures in real-world situations using appropriate tools or technology.	• Identify the effect on area or volume when changing linear dimensions. • Find the area of regular polygons
Objective 2: Solve real-world problems using visualization and spatial reasoning. • Solve problems involving geometric probability.	• Solve problems using the Pythagorean Theorem and its converse. • Solve problems using the distance formula. • Solve problems involving trigonometric ratios.	• Identify geometric probabilities by performing simulations involving length or area
		• Model and solve geometric situations using algebraic properties • Use notation for transformations